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Big Constraints to Small Firms' Growth?

Business Environment and Employment Growth across Firms

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Abstract

Using data on more than 56,000 enterprises in 90 countries, this paper finds that objective conditions in the business environment vary substantially across firms of different sizes and that there are important non-linearities in their impact on employment growth. The paper focuses on four areas: access to finance, business regulations, corruption, and infrastructure. The results, particularly on the impacts of finance and corruption on growth, depend on whether and how the analysis accounts for the possible endogeneity of the business environment. Controlling for endogeneity revises the finding that small firms benefit most from access to finance, particularly for sources of finance associated with investment and growth. The findings are also sensitive to how "small" is defined. Differentiating micro (less than 10 employees) from other small firms shows that, while small firms can be disadvantaged in such an environment, micro firms tend to be proportionally less affected by a weak business climate—and, on occasion, it can help them to grow. Overall, allowing different size classifications provides insights into the impact of the business environment that are lost in more aggregate analyses.

This paper—a product of the Growth and the Macroeconomics Team, Development Research Group—is part of a larger effort in the department to understand the microeconomics of growth. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at mhallward@worldbank.org.

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1. Introduction

An issue of particular relevance for economic growth is how the development of markets and institutions influences the growth of firms. This issue is even more important in developing countries, where markets and institutional infrastructure are less developed. A related concern is whether an adverse business environment affects the efficiency and the dynamism of the business sector.

This paper uses firm- level data on more than 56,000 enterprises in 85 developing countries and 5 high-income economies to assess the effects of the broader business environment on employment growth by firms, focusing on differences across firm size. This paper is related to two strands of literature. First it relates to recent studies (Restuccia and Rogerson (2008), Hsieh and Klenow (2008)) that show that there is considerable resource misallocation across firms, which is driven by firm specific distortions. While these studies are silent about the nature of the distortions, they show such distortions lead to substantial aggregate productivity losses, and that differences in the degree of distortions would explain a significant portion of why India and China exhibit lower manufacturing productivity than the United States. This paper examines differences in business environment across firm size, and therefore it helps to provide a better understanding of which dimensions of the business environment matter and the heterogeneity of distortions across firms.

This paper is also related to a number of studies that assess the effect of different dimensions of the business environment on firms' performance. Several studies in the literature examine the effect of employment regulations on firms' adjustment and on labor market outcomes more generally.[1] Others look at the effect of regulations of entry of firms on firm creation and growth.[2] A number of them investigate the importance of access to finance for firm development and growth.[3] Overall, these studies indicate that regulations on labor, entry barriers for firms, and financing conditions can have a direct impact on firms'

[1] A few recent examples are: Botero et al. (2004), Besley and Burgess (2004), Almeida and Carneiro (2009), Haltiwanger, Scarpetta and Schweiger (2006), Micco and Pagés (2006), Petrin and Sivadasan (2006) and Autor, Kerr and Kugler (2007).
[2] For example: Djankov et al (2002) and Klapper, Laeven and Rajan (2004).
[3] For example: Demirgüç-Kunt and Maksimovic (1998), Rajan and Zingales (1998), Beck, Demirgüç-Kunt and Maksimovic (2005), Galindo and Micco (2007).

employment decisions. However, other aspects of the business environment can affect these decisions as well, raising costs and risks associated with doing business or by creating barriers to competition. By affecting the overall growth prospects, issues from the quality of infrastructure, the strength of property rights, the nature and enforcement of business regulations and the overall openness in the management of public resources can all affect firms' growth (World Bank, 2004). This paper looks at the joint and relative importance of a number of dimensions of the business environment on firms' growth.

Unlike most existing studies which rely on variation in business environment conditions across countries, sectors or sub-national territories (states), this paper exploits firm level data on the business environment conditions faced by firms. Yet, there are a number of methodological issues that need to be addressed, including potential measurement error, omitted variable bias and endogeneity. To minimize the risk of the first two problems, the analysis is conducted with full set of sector-survey interaction dummies. In addition to controlling for some potentially important omitted variables, and measurement errors, they also control for survey differences and differences in demand conditions. In addition, incorporating multiple dimensions of the broader business environment simultaneously deals seriously with concerns of omitted variable bias of papers that include only a single dimension, such as labor regulations or finance.

To address potential endogeneity, this paper uses location-sector-size averages (minus individual firms' own responses) of the business environment measures rather than individual firms' own responses. The paper shows that there is a large potential degree of endogeneity in individual responses and that the results vary considerably if such endogeneity is not accounted for. The paper also makes the point that how these averages enter into the regressions matters greatly. Using the location-sector-size average does not necessarily address the endogeneity problem – if the averages used are based on current size. As objective conditions can be more challenging for smaller firms (e.g. smaller firms are less likely to access finance and more likely to pay bribes), assigning firms that grow substantially their current more favorable IC conditions, rather than those faced by firms of their initial size, can introduce a mechanical relationship between employment growth and many of the IC measures. Matching the averaged indicators to initial size is needed to avoid

this problem. This methodological contribution is most visible in estimating the effects of access to finance and corruption, which are the two areas where endogeneity is most likely.

Using firm level data allows us to focus on the question of whether the impact of the business environment is neutral across firm size. Market failures or policy created distortions can create fixed costs in the operation of businesses, creating cost disadvantages for smaller firms (see Tybout 2000 for review of issues). The costs of dealing with credit market information imperfections or with a complex and non-transparent regulatory environment are some examples of such non-linearities. Large firms may also have more political influence and shape regulations and policies in their favor. On the other hand, smaller firms may benefit from lax enforcement of regulations or lower harassment from corrupt public officials. Across the world, a sizeable amount of public resources are devoted to the development of micro, small and medium firms, yet unlocking potential constraints to their performance is another, perhaps equally effective, development strategy. The main objective of this paper is to assess whether there are heterogeneous effects of unlocking business environment constraints.

Differential effects across firms of different size can stem from two sources. First, there can be differences in the underlying objective conditions faced by firms. The paper focuses on the effect of four areas of the business environment: access to finance, the regulatory environment, corruption and access to infrastructure. Second, the same conditions can potentially have differential or non-linear effects on employment growth by size. Thus, it could be that the same extent of external finance is more beneficial to smaller firms or that the same extent of power outages is less damaging to larger firms because they have access to generators.

The paper finds evidence of both effects. The paper does find that micro and small firms have less access to formal finance, face significantly greater interruptions in infrastructure services, and pay more in bribes—as a percentage of sales—than do larger firms. In turn, larger firms spend significantly more time dealing with officials and red tape. The results indicate significant non linearities across firm size in the impact of these conditions too. A lack of finance and poor infrastructure reduce the growth of medium and large firms. Business regulations affect mostly the growth of small firms, which seemingly prefer to remain small to keep below the radar of regulators.

The results also show the importance of distinguishing between micro (less than 10 employees) and small firms (10-49 employees). By refining the definition of small firms, the message is refined to show that while small firms can face more challenging conditions, the very small or micro firms can actually benefit—in relative, and in some cases even in absolute, terms—from an adverse business environment. This can potentially explain why very small firms account for a larger share of employment in countries with an adverse business climate.

The paper is structured as follows. Section 2 reviews the related literature. Section 3 describes the data. Section 4 examines how objective business conditions vary by types of firms, emphasizing the different patterns across different sizes of firms. Including lagged performance variables in these regressions reinforces the need to address endogeneity—and indicate the likely directions that employment growth might have on different dimensions of the business environment. Section 5 describes the impact of objective conditions on employment growth using location-sector-size averages instead of individual firm responses. Section 6 conducts a number of robustness checks. Section 7 concludes.

2. Literature Review

There is a growing literature that assesses the effects of the set of factors, policies and institutions, commonly known as business environment or investment climate, on the performance of firms and economic growth. The methodologies used by these studies are very diverse. A number of studies have focused on cross-country variation to identify the effect of labor regulations (Botero et al, 2004; Heckman and Pagés, 2004), regulation of entry (Djankov et al., 2002) or a wide set of regulations (Loayza, Oviedo and Servén, 2006). These studies relate objective (*de jure*) measures of regulation at the country level to aggregate country outcomes. Although the results are suggestive of the importance of appropriate regulations for business development, they suffer from important methodological constraints ranging from omitted variable bias to endogeneity concerns.

Another group of studies employ a difference-in-differences method first developed by Rajan and Zingales (1998). These studies analyze the effect of different aspects of the business environment at the country-industry level. They show that financially dependent

industries grow faster in financially developed markets (Rajan and Zingales (1998)), and that firms in industries dominated by small firms grow faster in more financially developed markets (Beck et al. (2008)). Studies have also found that industries in which entry is more important exhibit less growth in countries with restrictions to firm entry (Klapper, Laeven and Rajan (2004)). Finally, Micco and Pagés (2006) show that industries that are inherently more volatile create fewer jobs and are less developed in countries with very restrictive hiring and firing regulations.

While improving on cross-country studies, the former studies suffer from three potential shortcomings that can be addressed in our study. First, in most cases variation in business environment conditions is captured with country level variables that reflect *de jure* regulations or conditions, that is, the procedures and costs that would be incurred if firms fully complied with what is on the books. However, there can be large gaps between what is on the books and what is experienced on the ground. This is particularly true in lower income countries and those with higher levels of corruption. (Hallward-Driemeier and Aterido (2007); Kaufmann, Kraay and Mastruzzi (2007)). In that regard, it is desirable to have measures of de facto regulation.

Second, it is important to explore variation in the business environment not only across countries but also within country boundaries—across sub-national areas and especially, across firm size and ownership.[4] Having disaggregated variables allows for hypotheses to be tested without having to assume that one country is the benchmark or "best" case against which to compare other countries.

Third, while most studies look at the effects of individual dimensions of the investment climate, our focus is on regressions that combine multiple dimensions in a single regression. This not only addresses potential bias in the estimates, it allows us to test directly which dimensions have the biggest impact on firm performance.

A number of recent studies make use of the World Business Environment Survey (WBES)[5]—a firm-level dataset with 4,000 firms across 54 countries—to study the effect of

[4] A few studies assess differences in business environment conditions within countries. Besley and Burgess (2004) and Ahsan and Pagés (2009) exploit differences in labor market regulations across Indian states to assess how different labor market regulations affect economic performance across Indian states. Almeida and Carneiro (2009) assess the effect of variation of enforcement in labor regulations within Brazil.

[5] Despite their similar names, the World Business Environment Survey (WBES), a one off survey in 1999, is not part of the larger and ongoing World Bank firm survey effort, the Enterprise Surveys (ES). The earlier

the business environment on firm growth. Using subjective firm-level data measures of the business environment these studies show the importance of finance, corruption and property rights (Batra, Kaufman and Stone, 2003; Ayyagari, Demirgüç-Kunt and Maksimovic, 2006). Some other studies examine the relationship between business environment and firm growth using the newer Enterprise Survey, but for individual or small groups of countries (Dollar, Hallward-Driemeier and Megistae, 2005, for India, Pakistan, Bangladesh and China; Fisman and Svensson, 2007, and Rienikka and Svensson, 2002, for Uganda; and Bigsten and Soderbom, 2006, which reviews the literature for Africa).

A central area of focus for this paper is whether there are significant differences in the impact across firm types, particularly by firm size. The literature has largely examined this issue with regard to access to finance, generally finding smaller firms are more constrained (Galindo and Micco, 2007; Clark, Dollar, and Micco, 2004; Love and Mylenko 2005). Beck et al. (2005) is of particular interest here, as these authors include additional measures of corruption and property rights using the WBES firm-level dataset. Using firms' perceptions on potential constraints, they also find patterns across countries, with small firms benefiting most from greater financial and institutional development.

Our work expands on this literature in several dimensions. This paper nearly doubles the number of countries covered, with country samples approximately five to 10 times larger. Whereas Beck et al. (2005) use subjective firm responses as measures of the business environment at the firm level, we use objective measures (i.e., time spent with officials dealing with permits and licenses rather than a ranking of how burdensome red tape is on a scale of 1-5). Beck et al (2005) include a final table to address potential endogeneity of business environment conditions on firm growth using location-size averages of responses as instruments. However, as the averages are based on current size, we show that this strategy does not actually address endogeneity. Once we control for endogeneity, matching average conditions based on initial size, we no longer find that smaller firms benefit most from improved access to finance. We also use narrower bands on firm size categories, which lead to some interesting extensions on their results, and look at how results vary across country groupings, focusing on measures of institutional development.

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round primarily collected perception data regarding constraints and some information on firm performance. In some regions firms only provided information on their employment range, i.e., small, medium, large, making it impossible to use that data to study differences between small firms below and above 10 employees.

3. The Data

Our study is primarily based on the World Bank Enterprise Surveys (ES), a newly available collection of firm-level datasets for developing countries as well as a limited number of high-income countries.[6] Questionnaires are administered within a framework of common guidelines in the design and implementation.[7] The dataset is assembled using the *core survey*, which is a module of identical questions included in all questionnaires, thereby enabling cross-country analyses.

While in principle, the dataset contains information for approximately 80,000 firms in more than 110 countries, complete data for the variables used in our estimations are available for a subsample of approximately 56,000 firms in 90 countries in seven different regions surveyed during the period 2000-2006. For some countries more than one survey is available.[8] (See Table A1 in the Appendix for a complete list of countries and surveys available, as well as the number of observations in each country.) The median sample size is 350 firms, with several large countries having substantially larger samples (Brazil, China, India, Turkey and Vietnam have samples over 1,500). The sample of firms in each country is stratified by size, sector and location.[9] Because of this stratification, large enterprises are in general over-sampled in the ESs compared to their share in the number of firms, but not in terms of their contribution to GDP. The unit of analysis is the "Establishment" in the manufacturing and service sectors.[10] Most firms are registered with local authorities, although they may be only in partial compliance with labor and tax authorities. Unlike most

[6] The terms Enterprise Surveys includes surveys that have been implemented regionally under other names, such as includes BEEPS, Investment Climate Surveys and RPED surveys (World Bank 2004b and World Bank 2007).

[7] From http://rru.worldbank.org/InvestmentClimate/Methodology.aspx

[8] While efforts are shifting to building a panel dataset, most repeat surveys have been additional cross-sections. There are approximately 2,000 firms that enter twice in the dataset.

[9] From http://www.enterprisesurveys.org/Methodology/default.aspx#weights: ES have been conducted following simple random sampling or random stratified sampling. In a simple random sample, all members of the population have the same probability of being selected and no weighting of the observations is necessary. In a stratified random sample, all population units are grouped within homogeneous groups and simple random samples are selected within each group

[10] In Europe and Central Asia, the unit is the "firm." In all other regions it is the plant or establishment. As over 90 percent are single-plant firms, the distinction is not likely to affect the results.

firm-level datasets, this data spans the manufacturing and service sectors. Approximately 61 percent of the observations reflect establishments in manufacturing, while the rest are in the service sector.

The World Bank enterprise survey data was developed to provide information on firms' performance as well as on aspects of the investment climate faced by firms. Regarding firms' performance, the dataset contains information on a number of variables such as current employment, investment, or sales. It also contains retrospective information for these three variables, in most cases for up to three periods before the year of reference of the survey, but in some few cases only for two or one period before. We focus on the employment level or growth of *permanent* workers as our outcome variables of interest. We do not include other forms of employment, such as contract labor or temporary workers because there are differences in the consistency of reporting of total employment (i.e. permanent plus temporary) across some countries. Other important, additional, reasons to focus on the level and growth of permanent employment are that these variables are more likely to reflect the long-run performance of the firm, and their evolution is of higher concern for policymakers, as non permanent forms of employment tend to be considered as substandard or less preferred by workers.

Following Davis and Haltiwanger (1992, 1999), our measure of employment growth refers to the change of permanent employment during the period *t* and three years before, divided by the firm's simple average of permanent employment during the same period.[11] The measure is symmetric around zero and bounded by values -2, and +2 and while monotonically related to the conventional growth rate and a second order approximation of the logarithmic first difference, it allows computing meaningful growth rates for firms suffering sharp expansions or contractions, avoiding any arbitrary treatment of outliers. This is quite useful, because even when by construction our sample does not register firm exit, some firms experience sharp changes in employment due to its early/late stage of

[11] For firms that have been in business less than four years, we compute employment growth based on a two year difference, or if in business for only two years, one year difference. We then define controls EG(*s*) as one if we have computed employment growth *s* years apart, and zero otherwise and include these variables in our growth estimates to account for such differences in our estimations.

development.[12] Young, small firms may experience very large growth in their labor force; Bankrupt firms or firms on the verge of closure may suffer very large contractions prior to their final exit from the market. Due to differences in data availability, employment growth refers to different periods for different firms. We account for this difference in the period of reference in our empirical specifications.

The data also contains subjective and objective information on the business climate faced by individual firms, reflecting conditions at the time of the survey (period *t*). Regarding objective measures, the ones we focus on in this study, the dataset contains a set of measurements relative to various aspects of the investment climate as they are being experienced by the firm. We focus on three measures of access to finance and two measures of each of remaining three areas of the business climate. (See Table 2 for a description and summary statistics of these variables). We measure access to finance, by means of the share of investment financed with funds external to the firm (*sh-invest-fin*) or alternatively, with the share of working capital financed externally (*sh-work-cap*) or the share of sales on credit (*sh_sales_cr*) The sample means of those two variables are 21, 20 and 42 percent, respectively.

We measure business regulatory conditions with the percentage of time managers (*mng-time*) devote to dealing with authorities, or alternatively with the days firms devote to inspections. On average, firms spent 8.9 percent of their time dealing with government authorities, and almost 16 days dealing with inspections during the year previous to the survey. We measure the extent of corruption by means of either a dummy variable (*bribe y-n*) which captures whether a firm had to pay a bribe or the percentage of sales paid on bribes during the year previous to the sample (*bribe %).* To minimize the amount of sub-reporting the survey inquires about the amount paid in bribes by asking: "How much do firms similar to yours pay in bribes in order to get things done?" The survey means show a considerable incidence of corruption: 42 percent of firms declare having paid bribes, with an average amount of 1.5 percent of sales paid. Finally, we capture the extent of infrastructure bottlenecks by measuring the number of days firms remained without power service (*days-no power*) as well as the share of the average cargo's value lost while in transit (*losstransit*

[12] In principle, our sample allows identifying new entrants, i.e. firms that have been in business one year or less. However, as the sampling frame can be a year or two old, there is an under-representation of new entrants.

%) during the last year. Again, the survey means show non-negligible bottlenecks, with an average of 38 days during the year previous to the survey without power service, and 1.5 % of sales lost during transit.

Finally, the dataset also includes information on a number of firm characteristics such as size, age, location, export activity, ownership, and sector. This is an important feature of the data, which allows expanding previous aggregate cross-country analyses attempting to assess the economic impact of different aspects of the business climate to an analysis of whether business environment conditions differ across, and affect differently, different types of firms. The firm characteristics used in this study include: four size classes (*micro* 1-10 permanent employees, *small* 11-50, *medium* 51-200 and *large* more than 200,); three age categories (*young* 1-5 years, *mature* 6-15, and *older*–more than 15); two location types (*smallcity* or cities with less than 1 million or more and *largecity*, i.e capital cities or with one million or more) ownership (whether *foreign* or *government* represents 10 percent or more of ownership); whether the firm is an *exporter* (10 percent or more of sales); and a two-digit *industry* classification.

The sample contains a large proportion of micro and small establishments (39 percent micro and 34 percent small firms), with size measured with retrospective data generally referring to three years before the current period.[13] Only 11 percent are large firms. The sample also consists largely of young firms, with age also referred to the initial period for which information for a firm is available. Table A2 shows that 31 percent of firms in our sample were five or fewer years old, and 38 percent were between six and 15 years). According to the 10-percent thresholds noted above, 11 percent of the firms are foreign-owned, and 23 percent of firms are exporters.

The sample is well diversified across regions; 27.2 percent of the sample corresponds to East Europe and Central Asian countries; 20.9 percent of firms in sample are from Latin American and the Caribbean; 16 percent are from sub-Saharan Asia, 14.5 percent from East Asia and 10.2 percent from South Asia (see Table A.2 in the Annex). There is a smaller, but still significant representation of North Africa and the Middle East region (6.7 percent) and high income European countries (4.6 percent).

[13] In some cases the reference period is less than 3 years due to firm age or data availability.

Table 1 reports the mean and standard deviation of the *employment growth* measure across firm size with size measured as the initial size (three, two, or one year ago). There is positive employment growth across all firm sizes except for larger firms, which on average experience negative growth. The average firm level employment growth, according to our measure, is 12 %. Micro firms grew over the average, while small and medium growth was below average.

4. Variations in Objective Investment Climate Conditions by Firms

We start our analysis by examining differences in the reported business environment conditions across firms for the different investment climate (IC) variables defined in Section 3 and summarized in Table 2. To do so, we estimate the following specification:

$$IC\text{variable}_{ict} = \delta_1 + \delta_2 Small_{ict} + \delta_3 Medium_{ict} + \delta_4 Large_{ict} + \delta_5 Foreign_{ict} + \delta_6 Exporter_{ict} + \delta_7 Mature_{ijct} + \delta_8 Older_{ijct} + \delta_9 Government_{ijc} + \delta_{10} Smallcity_{ijc} + \delta_{11} Expand_{ict-1} + \delta_{12} Contract_{ict-1} + \lambda_c * \lambda_j + \varepsilon_{ict} \quad (1)$$

To capture differences in the objective conditions facing firms of different sizes we include size dummies (micro-enterprises is the omitted category), with the size measured by number of employees at the time of the survey (period t). We also control for whether the firm is foreign or government owned, whether it is an exporter, whether it is located in a large city (or capital) or not (large city is the omitted), as well as age categories (young is the excluded category), all measured at period t.

We also include variables $Expand_{ict-1}$ and $Contract_{ict-1}$, the rate of employment expansion or contraction in firm *i*, country *c*, between period t-1 and period t-3. The omitted category is that employment remained unchanged in the last period. The measures of contraction and expansion are thus lagged one period, to have them pre-determined, but the claims here are not causal. We are simply interested in describing the patterns across firms, examining whether there are differences in the reported objective characteristics across expanding and contracting firms. These coefficients will also provide information on whether endogeneity is likely to be an issue in the employment regressions.

Our focus is on within-country variations rather than across countries, therefore we include a full set of sector-survey interaction dummies ($\lambda_j * \lambda_S$). This allows us to control

not only for potential omitted variables at the country level but also for some possible measurement errors or differences in survey implementation across countries and sectors.

Table 3 reports the results of estimating this specification for the nine IC variables. The results show that there are significant differences across firms in most of the variables in each of the four areas of the investment climate (access to capital, business regulations, corruption and infrastructure.) Again, the focus is on differences across firms of different size. Regarding access to finance, our estimates indicate that controlling for firm characteristics and sector-survey interaction dummies, access to finance, measured as share of investment or working capital financed externally, grows monotonically with firm size, while the share of sales on credit picks for medium-size firms. Overall, large firms have more access to finance than medium, small and micro enterprises.

Regarding business regulations, micro firms report a lower share of management time devoted to dealing with government regulations, than small, medium and large firms. The pattern again is increasing in firm size, although in this case medium firms spend more time dealing with regulations than large firms. Days of inspections also increases monotonically with size with large firms spending more than triple the time dealing with inspections than small firms.

Regarding corruption, the incidence of bribes is the highest among small firms. In addition, medium and large firms pay less in bribes –as percentage of sales-- than small or micro firms. This can reflect fixed payments being relatively larger for small firms, or that they have less recourse to avoid making payments. The payments may also be correlated with the degree of compliance with regulations; micro and small firms may not meet all of the requirements and have to pay officials to maintain this position.

For infrastructure, the frequency of power outages hits small and medium firms hardest and large firms the least. Larger firms are more likely to have alternative sources of electricity (given the substantial fixed costs of owning and operating a generator). It is also possible that larger firms have a greater choice among possible locations and thus chose to operate in areas with more reliable electricity, a hypothesis that is tested for below. Similarly, losses in transit are largest among small and medium size firms.

The specifications reported on Table 3 provide some other important results. Perhaps the most important one is that there are indications that reported business climate

conditions are related to firm performance. For example, firms that expanded or contracted in the period previous to the survey report a higher dependency on external funds and more management time dealing with officials relative to firms that were stable in size. On their part, contracting firms spend more time in inspections than expanding or stable firms. Similarly, the incidence of corruption (whether a firm pays bribes) appears to be more severe for firms that are expanding or contracting relative to stable firms. It appears corruption and dealing with authorities are the price to pay to either get ahead or preserve the firm in bad times. Finally, firms that are growing or contracting report more blackouts and more losses in transit than firms that are stable in size. While it may be that objective conditions vary across stable firms and the rest, it is also likely that power outages and transit losses are more distortive for growing or contracting firms, and therefore, they recall more such events and report higher values in those questions than firms that are stable.

The former regressions suggest that objective business conditions vary systematically across firms of different size and economic performance. Yet, none of these claims should be interpreted as causal, as one could also expect causality to run in the opposite direction, that is, the constraints firms face determine their size and their performance. However they do caution of a possible endogeneity of reported investment climate conditions relative to firm performance. We address this topic in the next section of the paper.

5. Methodology to Estimate the Impact of Investment Climate Conditions on Firm Employment Growth

We estimate the effect of investment climate (IC) conditions on employment growth by means of the following specification:

$$\begin{aligned} Empg_{ict,t-s} &= \beta_0 Small_{ict-3} + \beta_1 Medium_{ict-3} + \beta_2 Large_{ict-3} + \sum_k \beta_{3k} IC_{ikct} \\ &+ \sum_k \beta_{4k} Small_{ict-3} * IC_{ikct} + \sum_k \beta_{5k} Medium_{ict-3} * IC_{ikct} + \sum_k \beta_{6k} Large_{ict-3} * IC_{ikct} \\ &+ \beta_7 Foreign_{ict} + \beta_8 Government_{ict} + \beta_9 Exporter_{ict} + \beta_{10} Mature_{ict-3} + \beta_{11} Older_{ict-3} + \beta_{12} Smallcity_{ict} + \\ &\beta_{13} EG(s)_{ic} + \beta_{14} Empg\_cell_{ic} + \lambda_j * \lambda_s + \varepsilon_{ict} \end{aligned} \quad (2)$$

where $Empg_{ict,t-s}$ refers to the growth of permanent employment of firm *i* in country *c* between period *t* and *t-s* (generally three years before, but in a few cases, where information for period t-3 is not available, at periods t-1 or t-2). Differences in the period of definition of employment growth are identified and controlled for by the dummies $EG(s)_i$ which take the value of 1 if employment growth is computed between periods *t* and *t-s* and zero otherwise. Investment climate conditions faced by firm *i*, in country *c* are measured along four dimensions (*k*): finance, regulations, corruption and infrastructure and are denoted by IC_{ikc}. While most previous studies focus on the effect of one aspect of the investment climate, our concern is that omitted variables may bias results. After all, environments characterized by ineffective business regulations, or high incidence of corruption are also often characterized by poor infrastructure or low access to finance. To overcome some of these concerns, we control for different indicators of business climate conditions and their interactions with firm size simultaneously. Size dummies are defined in four groups: *micro, small, medium and large* measured at the initial period of observation. The omitted category is *micro* enterprises employing between 1 and 10 employees. Age of the firm is specified in three categories: *young*, from 1 to 5 years old, *mature*, between 5 and 15 years old and *older*, above 15 years old and also refers to the initial period of observation. The other firm characteristics are dated at period *t*, the only period for which such information is available. We also control for ownership (*foreign, government)*, exporting status *(exporter)*, and location, with variables defined as reported in section 3.

To account for differences in demand conditions and productive structure, the regressions also include a full set of sector-country interaction dummies.[14] Thus, our focus is on within-country rather than across country variation. This decision reflects several factors. First, there is substantial variation of investment climate indicators within countries and we want to test if its impact is significant. Second, it controls for potential omitted variables at the country level. In addition, it could control for some possible measurement errors or differences in implementation across countries. As Haltiwanger and Schweiger (2005) note, in the ES there are some countries with particularly high net employment growth rates. However, there is a strong country-specific component, such that country effects yield relative magnitudes of job creation and employment growth. They also noted

[14] See Table A2 for the list of sectors included.

that the relationships of employment variations between size and age classes appear right. Thus, small and younger firms have higher job creation and destruction than older and larger firms within the country, when considering total employment. Therefore, statistical methods that remove country level effects are appropriate to draw conclusions within countries on the difference of the impact of investment climate on different types of firms.

The construction of the investment climate variables IC_{ikc} requires some explanation. A number of previous studies assess the investment climate experienced by firm i, using firm level subjective measures. Such studies rely on answers to questions of the form "how much (the dimension *k* of the business climate) is an obstacle for the growth of your firm?" with possible answers ranking between 1 and 5 (Ayyagari et al. 2008; Beck et al. 2005; Pierre and Scarpetta 2006; Johnson, McMillan and Woodruff 2002). Subjective assessments, while insightful, have a number of possible drawbacks. There is a concern that firms' perceptions of the business environment reflect idiosyncratic differences in the degree of optimism or pessimism of the individuals responding to the survey. Answers are also likely to be strongly influenced by the experience and performance of the firm (see Hallward-Driemeier and Aterido 2007).

Our analysis uses objective measures to gauge the relative importance of the investment climate to firms. While, in principle, objective measures may be less likely to be influenced by firms' performance than subjective measures, the results presented in Table 3 suggest that individual firms´ reported objective investment climate conditions are likely to be endogenous to firm performance, a feature that we need to take into account when estimating the effect of investment climate variables on firm performance.

To account for endogeneity, we construct a measure of the *IC* conditions faced by firm *i* on dimension *k* in country *c*, by averaging the responses of firms in the same country-location-sector-size cell, excluding the observation from firm *i* in computing that average.[15] To ensure adequate numbers of firms in each location-sector-size cell average, we drop one

[15] In some specifications we also assess whether results vary if we instead compute IC conditions by averaging the responses of firms in the same country-location-sector bins (i.e. excluding size as a dimension). Here we use a finer disaggregation of location. Above, locations are aggregated by city-size (e.g. capital cities and those with a population above one million, and cities below 1 million people). In the country-location-sector averages, we construct the cells based on the actual cities or towns the firms are located in. If the representation is low, locations are aggregated based on 5 size groups (capital cities or more than 1 million; 500,000-1 million; 250,000-500,000; 50,000-250,000; less than 50,000).

dimension of the cell until an adequate number is reached (i.e. first we substitute country-location-size bins, then country-sector-size)[16].

This captures the broader environment in which the firm operates and allows the individual firm's own contribution to the average to be excluded. The approach also has the benefit of not losing those observations where a firm did not answer all the individual investment climate questions.[17]

In constructing these measures, we actually take two steps before entering the averages into the regressions, with the second one being particularly important if endogeneity concerns are to be addressed. An issue is how the investment climate indicators are calculated and matched to firms in the regression. This requires differentiating between a firm's current size – that can be important in the conditions they report facing now – and their initial size – and the average conditions faced by firms of the size they were initially. Simply giving firms the average value of firms in their current size category is giving them the ex post conditions not the initial conditions. To justify this, one has to assume that the conditions faced by firms have remained constant over time, regardless of how they may have grown. The alternative we present assumes instead that conditions faced by firms are likely to vary as they grow. Rather, we make the less restrictive assumption that, within a location and sector, conditions facing firms of a certain size now are the same as the conditions facing the same sized firm in the earlier period. For example, we can use the information on conditions facing micro firms now to measure what micro firms faced three years before.

Thus, in the first step, we use the information that firms report about investment climate conditions they face in the current period. While it would be desirable to have the conditions they faced in the initial period three years ago, this information was not collected. However, we also recognize that firms that have recently changed size may report very

[16] If we were to keep always the original 4 dimensions same country-location-sector-size cell there are approximate 5,000 observations that are lost and results do not change substantially. We also used different minimum cell-size requirements (4-10 firms) and found results were robust. Results presented use the cutoff of at least 4 firms in a cell.

[17] This approach is very similar to using location-sector-size dummies as instruments (except that the firm's own value is not excluded in this calculation, the number of observations averaged in a cell may be very small, and the additional observations cannot be recovered if a single investment climate variable is not available.). The test of over-identifying restrictions could not be estimated using the full specification due to the large number of dummies and instruments. However, in specifications not using a full set of sector-survey interaction dummies, the restrictions could not be rejected at the 0.3 level.

different *IC* conditions relative to what is typical for firms that have been in a given size category for a while. To account for this we use a firm's average size in constructing the location-sector-size_averages of investment climate conditions. We do so by constructing averages of investment climate indicators within cells, which are defined according to firms' average size.[18] In the second step, we match these averaged indicators to firms – based on their initial, not current, size.[19]

This procedure has a number of advantages. The first is that as advanced in the former paragraph, IC averages based on firms' average size allows obtaining a more accurate measure of the IC conditions facing a firm in a given size category. Thus, if for example, firms that have recently expanded report lower access to capital than firms that have been large for a while, then accounting for the observations of growing firms in the construction of the IC may underestimate the average access to capital of large firms. A similar effect may happen for firms that have recently contracted, and report access to capital or other IC, which are more representative of firms that are large than of firms that are small. Considering firms based on their average size ameliorates this problem.

Second, constructing a measure of *IC* conditions based on the initial instead of the current size is a key feature to minimize endogeneity problems. Thus, if we consider again the example of a firm that expands from being small in period t-3 to medium in t, it matters whether the firm is assigned the average IC conditions of small or medium firms. The main point is that matching based on current size reintroduces endogeneity as firms that grow are assigned higher access to credit, just because they have grown, which creates a positive correlation between the error term and the IC conditions. Our procedure, assumes that the conditions that matter for employment growth are those prevalent in the past, and that objective conditions remain constant over time for size classes of firms, not for individual firms themselves. These hypotheses allow us constructing measures which are exogenous to

[18] We repeated the exercise using current size in defining the cells for calculating the IC variables and did not find significant differences. For firms that remain in the same size category there is no difference between the two approaches.

[19] An example may be useful to clarify our procedure. Let us consider, for example, a textile producing firm in the capital city of Chile, which was small in period t-3, has grown to be of medium size in period t and the average size in the two periods is medium. We use its responses on the investment climate indicators to construct the average of Santiago-textile-*medium* size firms. However, this average is not what is then used for that firm in the regressions. Since we want to capture the average IC conditions of that firm in period t-3, when it was small, we match it to the average reported IC investment climate conditions of Santiago-textile-*small* firms.

the firm and control for the fact that firms may choose to grow/or not grow to face a determined set of IC. We show in our estimates the importance of how the IC variables are constructed for the results.

While we believe our constructed *IC* variables to go a long way towards addressing endogeneity, a lingering concern is that our results may be capturing the effects of shocks that are correlated across firms, which drive our constructed average IC *and* individual firm performance. We reduce any possible biases brought by these correlations, by introducing as an additional regressor the average employment growth of the cell used to compute the *IC* conditions of firm *i* (excluding as usual, the employment growth of firm *i* in that calculation). This variable is denoted as $Empg\_cell_i$.

6. Results

We now describe the results attained with our estimation procedure, and presented in Table 4, column (1). The results indicate important non-linearities in the effects of business environment constraints across firm size. They also suggest that a weak business environment tends to hurt the growth of small, medium and large firms, and benefit in relative terms –and for some variables, even in absolute terms—the growth of micro firms. As addressing endogeneity is one of our chief concerns, columns (2) – (5) demonstrate the significance of alternative means of addressing it – or of failing to do so.

For all specifications, coefficients on firm characteristics (other than size), the set of sector-survey interaction dummies and the constant are not reported due to space constraints. As expected, the coefficients on firm size's categories indicate that employment growth declines monotonically with firm size.[20] We focus next on the coefficients on the investment climate and their interactions with firm size.

6.1. Access to Finance

[20] There is a debate in the literature whether it is appropriate to use initial size or average size in firm growth regressions (see Teal 1999; Bigsten and Soderbom 2006). Proponents of Gibrat's Law favor the latter, although even using average size can still lead to the result that smaller firms grow faster than larger firms. We repeated our regressions defining the size controls and the investment climate interactions based on average size and found very robust results. (Note, to keep from reintroducing endogeneity, what one must avoid is using a measure of size from a time period prior to the one used in matching the investment climate averages to firms.)

The impact of better access or lower cost of finances on firms' growth has been studied by a number of authors.[21] Beck et al. (2005) argue that financial access should favor small firms. In their work, they find that firms' self reported (subjective) constraints on access and cost to finance are associated with lower growth of small firms relative to large firms. Table 3 showed that there are differences in the amounts of finance available, which could already explain why smaller firms are more likely to complain about finance. Here, we test whether, even for the same amount of financing (measured as percentage of investment financed externally), the impact would be different across different types of firms. Notice that finance is defined such that a larger number implies better access to finance. The results show strong non-linearities across firm size, and unlike earlier results, we find a positive effect of increased access to finance on the employment growth of medium and large firms and no significant effect among micro and small enterprises.[22]

We investigate the sensitivity of these results to different ways of estimating the IC measures and find the results to be quite sensitive to whether and how we account for endogeneity.

It is useful to compare our results in column (1) with those obtained using firms' individual own responses (column 2). While the number of observations declines –since not all firms report information for such variables—we find that using reported individual measures, access to finance has a positive effect across all firms which does not differ substantially across firm size, suggesting, that not controlling for endogeneity may overestimate the effect of finance on micro and small firms. Notice that differences in coefficients across columns (1) and (2) are not due to the smaller number of observations in column (2). Column (3) reports the results of reproducing the estimates presented in column (1) for the same sample as in column (2) and the results do not vary much: If anything the finding that finance helps medium and larger firms if endogeneity is properly controlled for becomes even stronger.

In column (4), we report the results when using IC measures which are constructed as reported in Section 3, but with the only difference that the averages within country-city-sector-size cells are matched to *current* rather than *initial* size. As mentioned, this is likely to

[21] See for example, Demirgüç-Kunt and Maksimov (1998), Rajan and Zingales (1998), and Beck et al. (2005).
[22] The test that the overall effect of access to finance on medium and large firms is equal to zero is rejected at the 10 percent significance level for large firms and at the 12 percent level for medium firms.

re-introduce some level of endogeneity as growing firms are matched with higher levels of access to finance. In this case we find that all firms benefit from access to finance, and while the coefficients point to smaller benefits for larger firms, differences across firm size are not statistically significant.

The fact that results are fairly similar when using individual firm responses or cell averages matched to current size, and at the same time quite different from the results when measuring IC based on cell averages matched to initial size, suggests that (i) endogeneity is likely to bias the estimates when not accounting for it, and that (ii) using averages matched on current size does not solve the endogeneity problem. Quite the opposite, it reintroduces endogeneity in the IC measures due to the match.

Our findings also suggest that the results found by previous studies that access to finance benefits mostly the smaller firms may be driven by endogeneity. In our sample, there are as many as 16% of the firms that start up as micro and transit to larger firms. Depending on the procedure, such firms either report higher access to capital for endogeneous reasons (i.e. because they have grown), or are matched with higher access to capital than the average of initially small firms (i.e. are given the average access to capital of larger firms). This creates a positive bias in the coefficient for micro and small firms. Conversely about 7 % of large firms shrink and become smaller firms in our sample. As they become smaller, they are likely to report lower access to finance or, depending on the method, be matched to the access to capital of smaller firms. This creates a downward bias in the coefficient of larger firms.

Column (5) presents the results of further assessing the robustness of our main results when constructing the IC averages with country-sector-location averages. Results confirm the findings presented in our basic specification (column 1): increased access to external finance to fund investments seems to benefits mostly medium-size and larger firms.

Why would micro or small firms not be positively affected by increased access to finance? Jeong and Townsend (2007) show that with a wide range of talent among micro-entrepreneurs, access to finance may not be the binding constraint they face in growing their firms. If access to finance is restricted, individuals with high entrepreneurial talent but low wealth are size constrained, and the demand for wage employment is low, which drives many individuals to become entrepreneurs even when they do not have much

entrepreneurial talent. Increased access to finance sorts the good from the less talented entrepreneurs. Those who are good can grow their firms; those who have lower entrepreneurial talent suffer as wages increase due to an increase demand for labor. Our estimates, particularly the negative, albeit not statistically significant coefficient on micro firms, may then reflect this selection effect.

6.2. Regulatory Environment

Measures of the regulatory environment show that business regulations measured as the share of time that management devotes to dealing with government regulations have differential effects across firm size. Our results suggest that regulations create growth bottlenecks for small firms, which may fear/avoid expansion to limit their exposure to red tape and increased enforcement. Testing the overall significance by size confirms that the overall effect of regulations on employment growth for small firms (the sum of the coefficient on micro and small firms) is significantly different from zero while those for medium and large firm are not. Thus, business regulations do not appear to affect the growth of larger firms. On the other hand, the positive effect for micro firms suggests that micro firms benefit from a generally lower enforcement stand for micro firms, which may help divert some economic activity to micro firms.

Results are quite similar across all specifications regardless of how the IC variables are computed, suggesting that endogeneity may be a less important concern in this case.

6.3. Corruption

Moving on to results for corruption, we find that as in the case of access to finance, results vary substantially whether and how we account for endogeneity. Results based on individual responses (column 2) or cell averages matched to current size (column 4) would suggest that corruption helps micro firms, while having a much smaller, and in some cases negative effect on the growth of larger firms. Measuring the incidence of corruption based on country-industry-location size averages matched to initial size or on country-industry locations, in our opinion, two better ways of accounting for endogeneity, yields results that go in the same direction but are not statistically significant. This suggests that while corruption may have differential effects across firm size, and possibly adverse effects on

medium size firms, the presence of endogeneity creates biases that increase the probability of finding this result.

6.4. Infrastructure

With regards to infrastructure bottlenecks, measured as the incidence of power outages, results are again quite sensitive to whether we control or not for endogeneity. Using our baseline specification (column 1), we find evidence that infrastructure bottlenecks tend to stunt the growth of medium and large firms. Instead, the coefficient for micro firms is positive, indicating that again, micro firms may benefit from the troubles of larger, possibly more productive firms as some production may be diverted to micro firms. The coefficient on micro firms however is not statistically significant. But the difference between micro and small/medium firms is larger taking into account that small and medium firms report more frequent outages than micro firms. This is consistent with micro firms using less capital and energy intensive modes of production and benefiting that these processes can be sustained due to hardships hitting the SMEs.

Results appear stronger when individual firms' responses are used to compute IC but the coefficients are of similar magnitudes than those reported in column (1). This suggests that endogeneity does not appear as a large concern and that results in column (3) are estimated with more precision as IC vary at the firm level. Computing IC out of the average within country- location-sector cells also yields similar but stronger results than in column (1). All in all, the results suggest that poor infrastructure has a detrimental effect on the growth of all firms but the micro ones.

7. Robustness

We now examine whether our results are robust to changes in the definition of variables, set of controls, and sample of countries.

7.1. Addressing Other Possible Sources of Endogeneity

Another source of potential endogeneity is whether better performing firms choose locations based on the quality of the business environment. To see if this could be

significant, column (1) reports the results if we restrict the sample to domestic-owned, micro and SME's who are least likely to be footloose and where the location tends to be associated with the places of birth or residence of the business owner. Foreign firms and large domestic firms are the most likely to be selective in their choice of location. The results are very robust.

7.2. Alternative Definitions of Investment Climate Indicators

The second set of robustness checks involves using alternative measures of the different investment climate areas. The surveys generally provide various measures to choose from. Of particular interest are measures on access to finance. There are two sets of results, that the nature of the finance being captured matters, and, that the results are somewhat sensitive to whether variation across sectors within a country is included or not.

To examine the different types of finance, two additional measures are included – the share of sales made on credit and access to working capital from external institutions. The measures used so far captures a type of finance that is relatively more difficult to access, namely financing for longer term investment projects from formal financial institutions. The other two alternatives presented in Table 5 measure access to a more informal form of financing and to shorter term financing from institutions. In the case of the share of sales on credit, the results show that micro firms do not share in the benefits of access to this financing, consistent with such credit being offered less by micro firms. Small and medium sized firms do benefit. The impact on large firms is not significant, which again is not so surprising as this type of finance is relatively less important for them. For access to working capital, column (3) the benefits are more widespread. If anything, this type of financing is most beneficial for the micro firms, although the differences across sizes are not significant.

The second point is that these results are sensitive to whether one allows for sectoral variation within countries to be included. Our results so far have included the full set of interacted sector-survey dummies. However, here (Table 5, columns 2-4) the results are more significant when sector and country dummies enter separately. There are two interpretations that can be given to this finding. First, the original rationale to include the broader set of dummies was in part to control for demand shocks that could vary by country and sector. Failing to control for sector-country shocks, endogeneity could be re-entering

the regressions. Such shocks could affect firm performance and increase their demand for financing. This would imply caution in interpreting the results. However, there is a second interpretation. Work by Rajan and Zingales points to potentially important differences across sectors in the impact of improved access to finance for growth. Beck et al. 2008 show that sectors with a larger proportion of small firms stand to benefit disproportionately from financial development. Including interactions sector-survey dummies then shuts down this channel, explaining why these two variables, share of sales sold on credit and the share of working capital financed externally lose their significance when all the interactions are included in the regression.

Column (4) also includes alternative measures for the other 3 investment climate measures. They are days of inspections, the size of bribes paid and losses incurred during transportation delays. The measure of inspections has the same effect as that of management time spent dealing with officials, deterring small and medium sized firms from growing. However, the new measures of corruption do not offer new insights, and the use of the transportation related variable provides weaker results. One conclusion is that power, not transportation (at least when measured as percentage of sales lost in transportation), is the more important dimension of infrastructure affecting firm growth.

7.3. Variations in Definition of Size Categories

Table 6 investigates whether results are robust to variations in size classifications. For comparison purposes, column (1) reproduces the results of Table 4, column (1). Column (2), Table 6 reports the results of defining micro firms as firms with 5 to 10 employees, and excluding from the estimation firms with less than 5 employees. The other size categories remain unchanged. The results on access to finance weaken for medium sized firms, suggesting that the differential effects of finance between micro and medium size firms are in part explained by the more negative effect of finance on the smallest firms. This lends additional support to the selection story proposed by Jeong and Townsend, 2007, as the very small firms are the ones that are likely to be less productive, and therefore, more likely to be hurt by increasing costs of inputs driven by a higher supply of credit.

In column (3) we follow the size category cutoffs used by Beck et al (2005), which implies combining most of our micro with all our small into one category and combining our

medium with many of our large into the medium category and leaving only the very largest in the large category. With these cutoffs, and controlling for endogeneity, we do not replicate their finding that the smallest firms benefit the most (although their result is reproduced if we match conditions based on current rather than initial size). The results also show that it is not the very largest firms that benefit from finance relative to the small, but rather those in the mid size (50-500 employees) range.

The results on regulations show that the positive relationship is driven by the smallest firms, excluding those with less than 5 employees leaves the effect insignificant for the remaining micro firms. Still, the effect remains negative for the small firms. In column (3), when all the micro are excluded, the omitted category is now small and the effect is negative but not significant. Medium and large firms still have a more positive response to regulations than the small. However, combining the firms into the larger size categories misses the entire story, with no results appearing significant.

For corruption, however, the story does become stronger once the micro firms are dropped (column 3) or absorbed with small firms (column 2). Now there is a positive and significant effect for the smaller firms that is offset for the larger firms, significantly so for the very large firms. Combined with the regulation results, small firms above the 10 employee threshold, i.e. those that are large enough to find evasion from regulations more difficult, find measures of regulation more detrimental to their growth—but that corruption offers a way of mitigating these effects. For medium firms, regulations are not so detrimental as for small firms (in fact they have a small net positive effect) – and corruption is correspondingly less beneficial for medium firms.

7.4. Age versus Size

It is well known that size is strongly correlated with age, as firms tend to start operations small and grow overtime. We assess whether differences in the impact of business environment variables could be related to age rather than size by adding a full set of interactions of age dummies with IC variables to our baseline results (Table 4, column 1). Results for size*IC interactions remain very similar however, some interesting results emerge from the size interactions (see Table 7). We find that regulations tend to affect the growth of older, more established firms, relative to younger ones. Combined with the size

interactions, these results provide some interesting qualifications to our baseline results. They suggest that the adverse effect of regulations on the growth of small firms is more visible among firms that are small, but have been in business for a while, rather than for firms that are small and young. Similarly, these results allow qualifying the statement that micro firms benefit from a poor regulatory environment. In fact, the firms that have been around for a while are the ones that benefit from regulations, while micro-young ones do not. It may well be that a poor regulatory environment increases the survival of low productivity firms (i.e. firms that do not have the entrepreneurial ability to grow) because it penalizes more severely, higher productivity firms.

Another interesting result of the size interactions is that corruption seems to disproportionally benefit older, more established firms. Perhaps, age is correlated with the access to networks and influence channels. We may also be capturing that a corrupt environment makes the survival of certain types of firms more likely, which then are observed as older at the time of the survey. Addressing this form of sample selection is beyond the scope of this paper.

7.5. Different Samples

The results so far have pooled countries together (with sector-survey fixed effects), but it could be that the effects vary by country groupings, along dimensions that can reinforce or weaken the broader business environment. To test whether the institutional development of countries matter, we divide the sample according to the depth of credit markets (Table 8, columns 1-2), the degree by which countries control corruption (columns 3-4) and the strength of their rule of law (columns 5-6).[23] Quite interestingly, results for increased access to finance turn out to be much stronger in countries with a more developed financial system, suggesting again that a marginal development in a country's financial system tends to favor small, medium and to a lower extent large size firms, rather than micro firms. This also suggests that finance operates better in economies with more developed financial markets. This result is further confirmed by the results in columns (3) –

[23] We also looked whether there were significant patterns by income or GDP per capital. As the differences were less pronounced than those that capture the institutional environment, we do not report them. We do note, however, that this implies that it is indeed the broader institutional environment that does matter rather than income itself.

(4), which show that the effect of increased access to finance is stronger in economies with higher control of corruption and better rule of law all hallmarks of better functioning economies.

Business regulations, measured as the percentage of management time spent dealing with regulations, have a negative effect on the growth of small firms throughout most samples of countries, suggesting that the conclusion that stringent regulations may lead many small firms to grow less in order to hide from the authorities is quite robust to the inclusion or exclusion of countries. What is striking is that results are stronger in countries with either lower control of corruption or a weaker rule of law. It may be that the quality of the regulations in lower institutional environments are more burdensome, resulting in the greater constraints on small firms. It is also possible that more onerous regulations in a weak institutional setting opens the way to corruption or harassment on the part of officials encouraging firms to remain small and below the radar screen where possible.

The direct effects of corruption on the growth of firms tend to be more significant in countries with higher control of corruption. Corruption, in a setting where corruption is not controlled, does not have much of an effect. However, if, in a stronger institutional environment, there is still corruption, it provides incentives to keep operations small. The effects of corruption on larger firms are significantly negative in countries with better control of corruption. It thus appears that the distortions generated by corruption are more important and distort firm growth more in countries where markets and institutions are more developed and a higher share of resources is allocated via markets.

Finally, infrastructure bottlenecks appear as a constraint to the growth of small, medium and /or large firm in most samples of countries although the levels of significance vary across samples, with the stronger effects for medium-sized firm.

All in all, the results above suggest that improving on some domains of the investment climate constraints may be more important to the extent that other aspects of the business climate and institutional development improve. Thus, financial market development brings higher development to medium and large firms in regions where there is higher control of corruption and a better rule of law. Similarly, improving business regulations may be more important where institutional development otherwise lags.

Cracking down on corruption is still an issue even in more developed institutional countries, with particularly deleterious effects on medium and large firms.

8. Conclusions

This paper has provided new evidence of the role of the investment climate in employment growth. The results indicate significant differences across size categories of firms—both in terms of differences in objective conditions faced by firms and in terms of non-linearities in the impact of these conditions. The paper also devotes substantial effort to surmount endogeneity concerns between investment climate measures and business performance and finds that accounting for endogeneity reduces the differential effects of business climate on the performance of different types of firms. Yet, the results indicate that a poor business climate tends to hurt the growth of small, medium and large firms, and benefit in relative—but in cases also in absolute cases, micro firms.

It also finds that increased access to finance, particularly external finance to fund investment, has a larger positive effect in the growth of small, medium and large firms, particularly in economies with more developed financial systems or better rule of law. Thus, unlike previous literature, this paper does not find that the impact on employment growth of an extra unit of external finance is highest for micro firms. We interpret these results as evidence that micro firms are not necessarily more credit constrained. Instead, many micro entrepreneurs may have little willingness or capabilities to grow their firms. As access to finance increases, micro firms may endure input price increases and production displacement caused by the growth of large, more productive firms that attain higher benefits of increased access to finance. The results also reinforce the importance of differentiating the impact across size classes of firms and allowing micro firms (less than 10 employees) to be different from "small" firms.

Another important finding of this paper is that business regulations measured as a higher share of management time spent dealing with regulations or inspections, may stunt the growth of small firms. Thus, as management time dealing with authorities as well as inspections increase substantially with firm size, the marginal increase in enforcement can act as a strong disincentive to grow a firm.

What are the aggregate implications of these findings for the size, efficiency and dynamism of the business sector in developing countries? The results found in this paper suggest that a weak business environment displaces activity from large, medium and small firms in benefit of micro ones. To the extent that larger firms are more productive—as suggested by many theoretical models of firm dynamics—this would imply substantial resource reallocation from more productive to less productive ones, potentially leading to important losses in aggregate productivity. In addition, given that enforcement of taxes and regulations tends to be smaller in micro firms, a shift of economic activity towards these firms is likely to imply that a larger share of firms remain informal or semi-informal, reducing the capacity of the state of collecting taxes and paying for fundamental inputs for development such as education. Finally, if there are substantial fixed costs in activities like innovation or worker training, a higher share of activity in micro firms may imply more firms and workers locked in activities with limited innovation and growth opportunities.

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Table 1: Employment Growth

Initial size,t-3	Mean	p25	Median	p75
size 1-10	0.220	0.000	0.000	0.444
size 11-50	0.081	0.000	0.000	0.261
size 51-200	0.033	-0.087	0.000	0.200
size +200	-0.022	-0.115	0.000	0.122
Total	0.117	0.000	0.0000	0.293

Table 2: Variable Description

Variable	Description	mean	sd
Emp-gr	Employment growth	0.117	0.411
Labor,t	Number of employees in period t (log)	3.112	1.618
Sh-invest-fin	Share of investments financed externally	0.209	0.347
Sh-work-cap-fin	Share of working capital financed externally	0.201	0.137
Sh-sales-cr	Percentage of sales sold on credit	0.424	0.396
Mng-time	% of management's time dealing with regulations	8.872	15.104
Days-inspections	Total days spent on inspections during last year	15.990	31.721
Bribe y-n	Bribes given to get things done (yes-no)	0.425	0.494
Bribe (%)	Amount of bribe paid to get things done	1.507	4.242
Days-no power	Number of power outages experienced during the last year	38.143	83.993
Loss_transit (%)	Percentage of the average cargo's value lost while in transit	1.547	5.736

Table 3: Investment Climate by Firm's Characteristics

Dependent variable: Investment climate variable

	(1) Sh-invest-fin (%)	(2) Sh-work-capital-fin (%)	(3) Sh-sales-cr (%)	(4) Mng-time (%)	(5) Days-inspections (log)	(6) Bribe (yes/no)	(7) Bribe (% sales)	(8) Days-no power (log)	(9) Lost in transit (%)
Small	0.049***	0.045***	0.072***	1.239***	0.238***	0.029***	0.054	0.061***	0.143*
	(0.004)	(0.003)	(0.004)	(0.152)	(0.014)	(0.006)	(0.051)	(0.015)	(0.074)
Medium	0.093***	0.087***	0.096***	1.767***	0.508***	0.014*	-0.250***	0.050***	0.202**
	(0.005)	(0.004)	(0.005)	(0.199)	(0.017)	(0.008)	(0.060)	(0.018)	(0.086)
Large	0.119***	0.117***	0.090***	1.468***	0.715***	0.001	-0.361***	-0.088***	0.039
	(0.007)	(0.005)	(0.006)	(0.234)	(0.022)	(0.010)	(0.067)	(0.022)	(0.099)
Mature	0.013***	0.006*	0.009**	0.278*	0.038**	-0.004	-0.114*	0.063***	-0.192**
	(0.004)	(0.003)	(0.004)	(0.150)	(0.015)	(0.007)	(0.058)	(0.016)	(0.083)
Older	0.010**	0.011***	0.006	0.494***	0.059***	-0.020**	-0.236***	0.072***	-0.204**
	(0.005)	(0.004)	(0.004)	(0.180)	(0.017)	(0.008)	(0.065)	(0.018)	(0.089)
Exporter	0.030***	0.037***	0.048***	0.504***	0.085***	0.040***	-0.057	0.058***	0.217***
	(0.005)	(0.003)	(0.004)	(0.159)	(0.014)	(0.007)	(0.050)	(0.015)	(0.067)
Foreign	-0.041***	-0.025***	0.043***	0.094	0.061***	-0.016**	-0.080	-0.038**	-0.213**
	(0.006)	(0.004)	(0.005)	(0.183)	(0.018)	(0.008)	(0.064)	(0.018)	(0.088)
Smallcity	0.010***	0.009***	-0.014***	-0.190	0.025*	-0.053***	-0.228***	0.118***	-0.072
	(0.004)	(0.003)	(0.003)	(0.144)	(0.013)	(0.006)	(0.043)	(0.013)	(0.063)
Government	-0.035***	-0.013**	-0.041***	0.599**	0.000	-0.132***	-0.496***	-0.112***	-0.078
	(0.007)	(0.005)	(0.006)	(0.242)	(0.026)	(0.010)	(0.064)	(0.025)	(0.125)
Expand	0.041***	0.029***	0.029***	0.491**	0.018	0.053***	0.142**	0.098***	0.243**
	(0.006)	(0.004)	(0.005)	(0.209)	(0.019)	(0.008)	(0.069)	(0.020)	(0.098)
Contract	0.027***	0.040***	0.044***	1.771***	0.140***	0.088***	0.523***	0.059**	0.435**
	(0.009)	(0.006)	(0.007)	(0.308)	(0.027)	(0.012)	(0.105)	(0.028)	(0.169)
Survey*Sector f.e.	yes	yes	yes	yes	yes	yes	yes	yes	yes
Constant	0.133***	0.124***	0.359***	7.477***	1.516***		1.812***	1.570***	1.465***
	(0.005)	(0.003)	(0.005)	(0.184)	(0.018)		(0.066)	(0.018)	(0.097)
Observations	42519	63020	65531	63295	56794	51707	50610	61309	45272
R-squared	0.19	0.21	0.31	0.18	0.31	0.17	0.10	0.53	0.07

* significant at 10%; ** significant at 5%; *** significant at 1%; Robust standard errors in parentheses.

Firm characteristics are at time t.

col(6) is a dprobit, so coefficients are marginal effects and R-squared is Pseudo R-squared.

Table 4: Impact of Investment Climate on Employment Growth

Dependent Variable: Employment Growth (Emp(t)-Emp(t-3))/((Emp(t)+Emp(t-3))/2)

Investment Climate variable (ICvar)	(1) ICvar avg matched to *initial* size	(2) Individual firm response	(3) ICvar as in col. (1), with col. (2) sample	(4) ICvar avg matched to *current* size	(5) ICvar cell avg: survey-sector-location
Sh_invest_fin	-0.055	0.083***	-0.095	0.583***	-0.008
	(0.059)	(0.018)	(0.074)	(0.075)	(0.033)
(Small)*Sh_invest_fin	0.092	-0.022	0.090	0.039	0.047
	(0.065)	(0.023)	(0.077)	(0.070)	(0.040)
(Medium)*Sh_invest_fin	0.130*	-0.028	0.159*	-0.024	0.115**
	(0.075)	(0.024)	(0.086)	(0.083)	(0.045)
(Large)*Sh_invest_fin	0.136*	-0.019	0.221***	-0.134	0.110**
	(0.071)	(0.028)	(0.085)	(0.087)	(0.056)
Sh_mng_time	0.003**	0.001***	0.005***	0.011***	0.002***
	(0.001)	(0.000)	(0.002)	(0.002)	(0.001)
(Small)*Sh_mng_time	-0.005***	-0.002***	-0.008***	-0.004***	-0.004***
	(0.001)	(0.000)	(0.002)	(0.001)	(0.001)
(Medium)*Sh_mng_time	-0.003	-0.001**	-0.005**	-0.003*	-0.002**
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
(Large)*Sh_mng_time	-0.003*	-0.002***	-0.007***	-0.005***	-0.002**
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
Bribe_y_n	0.051	0.027***	0.043	0.015	0.025
	(0.041)	(0.010)	(0.046)	(0.045)	(0.021)
(Small)*Bribe_y_n	-0.004	-0.035***	-0.023	-0.031	-0.012
	(0.045)	(0.014)	(0.047)	(0.048)	(0.024)
(Medium)*Bribe_y_n	-0.073	-0.058***	-0.032	-0.104*	-0.041
	(0.054)	(0.016)	(0.053)	(0.058)	(0.030)
(Large)*Bribe_y_n	-0.056	-0.026	-0.025	-0.099*	-0.029
	(0.051)	(0.017)	(0.055)	(0.058)	(0.033)
Days-no power	0.008	0.009***	0.016	0.002	0.006
	(0.008)	(0.003)	(0.010)	(0.009)	(0.004)
(Small)*Days-no power	-0.006	-0.008*	-0.011	-0.007	-0.008**
	(0.005)	(0.004)	(0.007)	(0.006)	(0.004)
(Medium)*Days-no power	-0.014*	-0.010**	-0.021**	-0.024***	-0.015***
	(0.008)	(0.005)	(0.009)	(0.008)	(0.005)
(Large)*Days-no power	-0.015*	-0.010**	-0.020**	-0.019**	-0.014**
	(0.008)	(0.005)	(0.009)	(0.009)	(0.006)
(Small)	-0.110***	-0.108***	-0.071**	-0.136***	-0.103***
	(0.028)	(0.013)	(0.028)	(0.031)	(0.017)
(Medium)	-0.149***	-0.162***	-0.151***	-0.143***	-0.162***
	(0.032)	(0.017)	(0.032)	(0.035)	(0.021)
(Large)	-0.210***	-0.239***	-0.217***	-0.181***	-0.224***
	(0.031)	(0.019)	(0.034)	(0.037)	(0.023)
Firm Controls	Yes	Yes	Yes	Yes	Yes
Survey*Sector f.e.	Yes	Yes	Yes	Yes	Yes
Observations	56880	28619	28616	56880	55612
R-squared	0.15	0.18	0.18	0.17	0.15

Significant at * 10%; ** at 5%; *** at 1%; s.e. are clustered on survey-location-sector-size.

Firm Controls: dummies for firm age (t-3), foreign or government owned, exporter status, if in small city, empg base yrs, avg. employment growth in cell, and a constant term. Size is t-3. (Definitions in Section 3).

cols. (1) & (3) cells based on survey-sector-location-avg_size (excluding own); col. (4) uses current size.

Table 5: Robustness

Dependent Variable: Employment Growth (Emp(t)-Emp(t-3))/((Emp(t)+Emp(t-3))/2)

	(1)	(2)	(3)	(4)
	Control for possible location selection bias	Alternative measures of IC		
Investment Climate variable (ICvar)	Sample restricted SMEs domestic	Finance = Sh_sales_credit	Finance = sh_wkcap	4 alternative IC variables♦
Finance	-0.046	-0.039	0.194**	0.272***
	(0.061)	(0.033)	(0.083)	(0.089)
(Small)*Finance	0.093	0.092***	-0.108	-0.245***
	(0.065)	(0.033)	(0.072)	(0.075)
(Medium)*Finance	0.168**	0.066*	-0.126	-0.237***
	(0.079)	(0.035)	(0.085)	(0.091)
(Large)*Finance		0.034	-0.111	-0.178*
		(0.037)	(0.084)	(0.093)
Regulations	0.003**	0.004***	0.004***	0.012
	(0.001)	(0.001)	(0.002)	(0.012)
(Small)*Regulations	-0.005***	-0.006***	-0.005***	-0.029***
	(0.001)	(0.001)	(0.001)	(0.009)
(Medium)*Regulations	-0.001	-0.004***	-0.003*	-0.023*
	(0.002)	(0.001)	(0.002)	(0.013)
(Large)*Regulations		-0.005***	-0.003*	-0.017
		(0.001)	(0.002)	(0.014)
Corruption	0.047	0.007	0.033	0.004
	(0.042)	(0.024)	(0.034)	(0.006)
(Small)*Corruption	0.013	0.043*	-0.007	0.002
	(0.046)	(0.025)	(0.033)	(0.005)
(Medium)*Corruption	-0.055	-0.001	-0.070	-0.003
	(0.057)	(0.029)	(0.044)	(0.007)
(Large)*Corruption		0.021	-0.043	-0.009
		(0.033)	(0.043)	(0.008)
Infrastructure	0.006	0.008	0.008	0.000
	(0.009)	(0.005)	(0.008)	(0.004)
(Small)*Infrastructure	-0.003	-0.000	0.000	-0.000
	(0.005)	(0.004)	(0.005)	(0.004)
(Medium)*Infrastructure	-0.012	-0.008	-0.006	0.002
	(0.008)	(0.005)	(0.007)	(0.004)
(Large)*Infrastructure		-0.007	-0.009	0.003
		(0.006)	(0.007)	(0.005)
Firm Controls	Yes	Yes	Yes	Yes
Survey*Sector f.e.	Yes	No	No	No
Survey and Sector f.e.	No	Yes	Yes	Yes
Observations	46122	54442	54013	48411
R-squared	0.15	0.115	0.122	0.122

Significant at * 10%; ** at 5%; *** at 1%; s.e. are clustered on survey-location-sector-size.

Firm Controls: dummies for firm size and age (t-3), foreign or government owned, exporter status, if in small city, empg base yrs, avg. employment growth in cell, and a constant term.

All ICvar use cell avg, matched to initial size; cells based on survey-sector-location-avg_size (excluding own).

Col. (1) Finance=Sh_invest_fin; Regulations=Sh_mng_time; Corruption=Bribe y-n; Infrastr.=Days_no power.

Results in columns (2) and (3) use the same variables as column (1) with exception of Finance variable.

Col(4) ♦IC alternative: Finance=sh_wkcap; Regul.=days-inspections;Corrup.= bribe-%; Infrastr.=losstransit.

Table 6: Other Size Definitions

Dependent Variable: Employment Growth (Emp(t)-Emp(t-3))/((Emp(t)+Emp(t-3))/2)

	Baseline (Table 4 (1)) Micro (<10), Small(10-50) Medium(51-200) Large(+200)	(1) Exclude<5, Micro (5-10), rest of sizes as in col. (1)	(2) Small(5-50) Med. (51-500) Large(+500)	(3) Excluding micro(<10)
Sh_invest_fin	-0.055	-0.078	-0.047	-0.032
	(0.059)	(0.069)	(0.048)	(0.046)
(Small, t-3)**Sh_invest_fin*	0.092	0.084		
	(0.065)	(0.070)		
(Medium)*Sh_invest_fin	0.130*	0.132	0.114**	0.057
	(0.075)	(0.085)	(0.053)	(0.052)
(Large)*Sh_invest_fin	0.136*	0.149*	0.062	0.070
	(0.071)	(0.081)	(0.073)	(0.059)
Sh_mng_time	0.003**	0.002	-0.001	-0.002
	(0.001)	(0.002)	(0.001)	(0.001)
(Small)*Sh_mng_time	-0.005***	-0.004***		
	(0.001)	(0.002)		
(Medium.t-3)*S*h_mng_time*	-0.003	-0.001	0.002	0.003**
	(0.002)	(0.002)	(0.001)	(0.001)
(Large)*Sh_mng_time	-0.003*	-0.002	-0.000	0.002
	(0.002)	(0.002)	(0.002)	(0.002)
Bribe_y_n	0.051	0.014	0.007**	0.008**
	(0.041)	(0.044)	(0.004)	(0.004)
(Small)*Bribe_y_n	-0.004	0.037		
	(0.045)	(0.043)		
(Medium)*Bribe_y_n	-0.073	-0.026	-0.004	-0.005
	(0.054)	(0.055)	(0.005)	(0.005)
(Large)*Bribe_y_n	-0.056	-0.005	-0.019*	-0.012
	(0.051)	(0.053)	(0.011)	(0.008)
Days-no power	0.008	0.002	-0.004	0.001
	(0.008)	(0.009)	(0.009)	(0.008)
(Small)*Days-no power	-0.006	-0.002		
	(0.005)	(0.006)		
(Medium)*Days-no power	-0.014*	-0.010	-0.007	-0.007
	(0.008)	(0.008)	(0.006)	(0.006)
(Large)*Days-no power	-0.015*	-0.010	0.009	-0.002
	(0.008)	(0.009)	(0.010)	(0.008)
Firm Controls	Yes	Yes	Yes	Yes
Survey*Sector f.e.	Yes	Yes	Yes	Yes
Observations	56880	47491	47222	34474
R-squared	0.15	0.13	0.12	0.12

Significant at * 10%; ** at 5%; *** at 1%; s.e. are clustered on survey-location-sector-size.

Firm Controls: dummies for firm size and age (t-3), foreign or government owned, exporter status, if in small city, empg base yrs, avg. employment growth in cell, and a constant term.

All ICvar use cell avg, matched to initial size; cells based on survey-sector-location-avg_size (excluding own).

Table 7: Is it Size or Age that Matters?

Dependent Variable: Employment Growth (Emp(t)-Emp(t-3))/((Emp(t)+Emp(t-3))/2)

Investment Climate variable (ICvar)		Continuation	
Sh_invest_fin	-0.053		
	(0.064)		
(Small, t-3)**Sh_invest_fin*	0.093		
	(0.065)		
(Medium)*Sh_invest_fin	0.127*	(Mature, t-3)**Sh_invest_fin*	-0.004
	(0.076)		(0.037)
(Large)*Sh_invest_fin	0.132*	(Older)*Sh_invest_fin	0.003
	(0.072)		(0.041)
Sh_mng_time	0.005***		
	(0.001)		
(Small)*Sh_mng_time	-0.005***		
	(0.001)		
(Medium.t-3)*S*h_mng_time*	-0.002	(Mature)*Sh_mng_time	-0.002***
	(0.002)		(0.001)
(Large)*Sh_mng_time	-0.002	(Older)*Sh_mng_time	-0.004***
	(0.002)		(0.001)
Bribe_y_n	0.029		
	(0.042)		
(Small)*Bribe_y_n	-0.011		
	(0.046)		
(Medium)*Bribe_y_n	-0.087	(Mature)*Bribe y_n	0.037
	(0.056)		(0.024)
(Large)*Bribe_y_n	-0.071	(Older)*Bribe y_n	0.058**
	(0.053)		(0.029)
Days-no power	0.006		
	(0.009)		
(Small)*Days-no power	-0.006	(Mature)*Days_no_power	0.003
	(0.005)		(0.003)
(Medium)*Days-no power	-0.015*	(Older)*Days_no_power	0.003
	(0.008)		(0.004)
(Large)*Days-no power	-0.015*	Mature	-0.086***
	(0.008)		(0.013)
(Small)	-0.110***	Older	-0.137***
	(0.029)		(0.016)
(Medium)	-0.148***	Firm Controls	Yes
	(0.032)	Survey*Sector f.e.	Yes
(Large)	-0.209***	Observations	56880
	(0.032)	R-squared	0.15

Significant at * 10%; ** at 5%; *** at 1%; s.e. are clustered on survey-location-sector-size.

Firm Controls: dummies for whether firm is foreign or government owned, exporter status, if in small city, empg base yrs, avg. employment growth in cell, and a constant term. Size and age are t-3.

All ICvar are cell avg, matched to *initial* size; cells based on survey-sector-loc.-avg_size (excluding own).

This is a single regression, reported in two columns due to the many variables included.

Table 8: Institutional Effects (IC on Employment Growth)

Dependent Variable: Employment Growth (Emp(t)-Emp(t-3))/((Emp(t)+Emp(t-3))/2)

	(1)	(2)	(3)	(4)	(5)	(6)
	Domestic credit to private sector		Control corruption		Rule of law	
	<=median	>median	<=0	>0	<=0	>0
Sh_invest_fin	0.070	-0.112	0.020	-0.110	0.035	-0.158*
	(0.094)	(0.076)	(0.079)	(0.081)	(0.080)	(0.085)
(Small)*Sh_invest_fin	-0.097	0.202**	0.015	0.185*	-0.017	0.222**
	(0.093)	(0.084)	(0.081)	(0.099)	(0.079)	(0.096)
(Medium)*Sh_invest_fin	-0.019	0.203*	0.051	0.204*	0.016	0.311**
	(0.113)	(0.116)	(0.096)	(0.113)	(0.096)	(0.127)
(Large)*Sh_invest_fin	-0.026	0.145	0.026	0.096	0.005	0.197*
	(0.115)	(0.097)	(0.093)	(0.120)	(0.097)	(0.112)
Sh_mng_time	0.001	0.006**	0.002	0.002	0.002	0.002
	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)
(Small)*Sh_mng_time	-0.002	-0.009***	-0.003**	-0.005	-0.004**	-0.004
	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)
(Medium)*Sh_mng_time	-0.000	-0.005	0.000	-0.002	-0.000	-0.001
	(0.002)	(0.004)	(0.002)	(0.003)	(0.002)	(0.003)
(Large)*Sh_mng_time	0.001	-0.010***	0.001	-0.006*	0.001	-0.004
	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)
Bribe_y_n	0.049	0.043	0.016	0.136**	0.008	0.004
	(0.048)	(0.064)	(0.051)	(0.065)	(0.006)	(0.013)
(Small)*Bribe_y_n	-0.021	0.029	0.043	-0.118*	-0.003	0.006
	(0.045)	(0.070)	(0.055)	(0.063)	(0.006)	(0.014)
(Medium)*Bribe_y_n	-0.059	-0.072	-0.026	-0.252***	-0.007	0.005
	(0.063)	(0.087)	(0.069)	(0.086)	(0.008)	(0.015)
(Large)*Bribe_y_n	-0.030	-0.045	0.019	-0.178**	-0.010	-0.008
	(0.063)	(0.076)	(0.064)	(0.078)	(0.010)	(0.017)
Days-no power	0.003	0.012	-0.000	0.024	-0.000	0.018
	(0.010)	(0.015)	(0.010)	(0.020)	(0.010)	(0.017)
(Small)*Days-no power	-0.007	0.004	-0.000	-0.011	-0.001	-0.011
	(0.006)	(0.012)	(0.007)	(0.018)	(0.007)	(0.012)
(Medium)*Days-no power	-0.015*	-0.002	-0.005	-0.043*	-0.005	-0.030*
	(0.009)	(0.015)	(0.009)	(0.022)	(0.009)	(0.017)
(Large)*Days-no power	-0.007	-0.005	0.001	-0.025	0.009	-0.024
	(0.010)	(0.014)	(0.010)	(0.024)	(0.011)	(0.017)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Survey*Sector f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	31854	23157	41575	15205	33104	23667
R-squared	0.16	0.11	0.16	0.12	0.17	0.12

Significant at * 10%; ** at 5%; *** at 1%; s.e. are clustered on survey-location-sector-size.
Firm Controls: dummies for firm size and age (t-3), foreign or government owned, exporter status, if small city, empg base yrs, avg. employment growth in cell, and a constant term.
All ICvar are cell avg, matched to initial size; cells based on survey-sector-loc.-avg_size (excluding own).

Table A1: Dataset

Country	N. obs.	%	Country	N. obs.	%	Country	N. obs.	%
Albania2002	166	0.29	Ghana2007	249	0.44	Panama2006	550	0.97
Albania2005	202	0.35	Greece2005	539	0.95	Paraguay2006	561	0.99
Angola2006	274	0.48	Guatemala2003	451	0.79	Peru2006	603	1.06
Argentina2006	950	1.67	Guatemala2006	494	0.87	Philippines2003	614	1.08
Armenia2002	170	0.3	Guinea2006	181	0.32	Poland2002	495	0.87
Armenia2005	351	0.62	GuineaBissau2006	129	0.23	Poland2003	105	0.18
Azerbaijan2002	162	0.28	Guyana2004	152	0.27	Poland2005	969	1.7
Azerbaijan2005	348	0.61	Honduras2003	436	0.77	Portugal2005	501	0.88
Bangladesh2002	964	1.69	Honduras2006	419	0.74	Romania2002	254	0.45
Belarus2002	250	0.44	Hungary2002	245	0.43	Romania2005	586	1.03
Belarus2005	322	0.57	Hungary2005	602	1.06	Russia2002	488	0.86
Belarus2008	232	0.41	India2006	2,919	5.13	Russia2005	592	1.04
Benin2004	182	0.32	Indonesia2003	707	1.24	Rwanda2006	154	0.27
BiH2002	171	0.3	Ireland2005	499	0.88	Senegal2007	473	0.83
BiH2005	194	0.34	Jamaica2005	70	0.12	Serbia2003	399	0.7
Bolivia2006	556	0.98	Jordan2006	451	0.79	Slovakia2002	163	0.29
Botswana2006	253	0.44	Kazakhstan2002	249	0.44	Slovakia2005	208	0.37
Bulgaria2002	245	0.43	Kazakhstan2005	578	1.02	Slovenia2002	188	0.33
Bulgaria2005	291	0.51	Kenya2003	211	0.37	Slovenia2005	221	0.39
BurkinaFaso2006	131	0.23	Kyrgyzstan2002	166	0.29	SouthAfrica2003	551	0.97
Burundi2006	215	0.38	Kyrgyzstan2003	102	0.18	SouthKorea2005	594	1.04
Cambodia2003	464	0.82	Kyrgyzstan2005	199	0.35	Spain2005	601	1.06
Cameroon2006	165	0.29	Laos2005	225	0.4	Swaziland2006	208	0.37
CapeVerde2006	93	0.16	Latvia2002	170	0.3	Tajikistan2002	170	0.3
Chile2004	942	1.66	Latvia2005	200	0.35	Tajikistan2003	107	0.19
Chile2006	962	1.69	Lebanon2006	345	0.61	Tajikistan2005	199	0.35
Colombia2006	936	1.64	Lesotho2003	44	0.08	Tajikistan2008	316	0.56
CostaRica2005	333	0.59	Lithuania2002	193	0.34	Tanzania2003	245	0.43
Croatia2002	174	0.31	Lithuania2004	230	0.4	Tanzania2006	360	0.63
Croatia2005	229	0.4	Lithuania2005	196	0.34	Turkey-b2005	1,238	2.18
Czech2002	261	0.46	Madagascar2005	269	0.47	Turkey2002	513	0.9
Czech2005	327	0.57	Malawi2005	150	0.26	Turkey2005	544	0.96
DRC2006	271	0.48	Mali2003	123	0.22	Turkey2008	900	1.58
Ecuador2003	411	0.72	Mauritania2006	204	0.36	Uganda2003	291	0.51
Ecuador2006	592	1.04	Mauritius2005	177	0.31	Uganda2006	509	0.89
ElSalvador2003	459	0.81	Mexico2006	1,343	2.36	Ukraine2002	463	0.81
ElSalvador2006	620	1.09	Moldova2002	173	0.3	Ukraine2005	586	1.03
Estonia2002	160	0.28	Moldova2003	103	0.18	Ukraine2008	733	1.29
Estonia2005	214	0.38	Moldova2005	346	0.61	Uruguay2006	540	0.95
FYROM2002	165	0.29	Montenegro2003	100	0.18	Uzbekistan2002	255	0.45
FYROM2005	194	0.34	Mozambique2007	429	0.75	Uzbekistan2003	100	0.18
Gambia2006	126	0.22	Namibia2006	242	0.43	Uzbekistan2005	298	0.52
Georgia2002	173	0.3	Nicaragua2003	448	0.79	Uzbekistan2008	361	0.63
Georgia2005	199	0.35	Nicaragua2006	461	0.81	Vietnam-b2005	497	0.87
Georgia2008	325	0.57	Nigeria2007	2,005	3.52	Vietnam2005	1,109	1.95
Germany2005	1,195	2.1	Pakistan2002	937	1.65	Zambia2002	187	0.33

Table A2: Sample Composition

Region	Percent
Sub-Sahara Africa	16.01
East Asia & Pacific	14.45
East Europe & Central Asia	27.21
Western Europe	4.57
Latin America	20.87
Middle East & North Africa	6.72
South Asia	10.16
Income Level	
Low	31.43
Lower-middle	44.59
Upper-middle	16.36
High	7.62
Initial size	
Micro (1-10 employees)	39.36
Small (11-50 employees)	33.64
Medium (51-200 employees)	16.39
Large (+200 employees)	10.61
Initial age	
Young 1-5	30.71
Mature 6-15	38.34
Older +16	30.95
Non-exporter	77.35
Exporter	22.65
Domestic owned	88.82
Foreign owned	11.18

Sector	Percent
Textiles	5.3
Leather	1.15
Garments	8.46
Agroindustry	6.65
Beverages	7.17
Metals and machinery	9.42
Electronics	1.55
Chemicals and pharmaceutics	4.9
Construction	5.07
Wood and furniture	5.02
Non-metallic and plastic materials	4.37
Paper	1.98
IT services	3.85
Other manufacturing	1.39
Advertising and marketing	1.73
Other services	7.28
Retail and wholesale trade	17.67
Hotels and restaurants	3.41
Transport	2.52
Mining and quarrying	0.46
Other Transport Equipment	0.67
Labor intensive	31.69
Capital intensive	31.89
Services	36.42
Capital or city >=1million	35.27
City 500k to 1 million	13.22
City 250k-500k	15.43
City 50k-250k	17.86
City <50k	18.22